

Trend Study 30-35-03

Study site name: Deep Canyon.

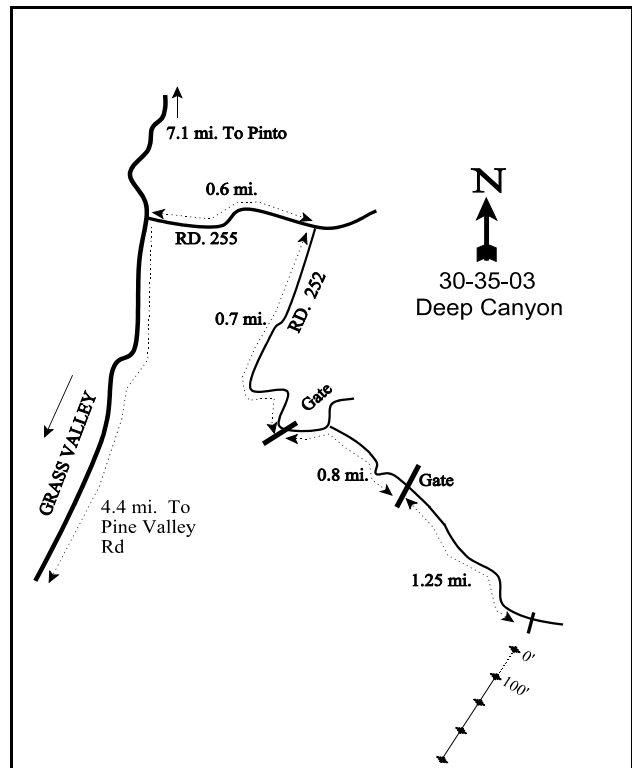
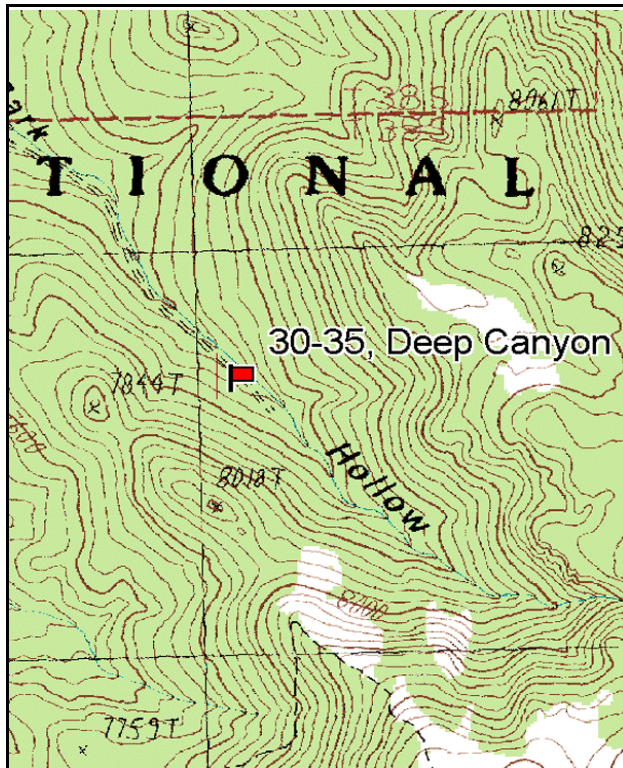
Vegetation type: Mountain Brush.

Compass bearing: frequency baseline 199 degrees magnetic.

Frequency belt placement: line 1 (19 & 88ft), line 2 (34ft), line 3 (59ft), line 4 (71ft). No rebar.

LOCATION DESCRIPTION

From Pinto, drive south 7.1 miles toward Grass Valley. Turn left (east) on the road toward Whiterocks trail. Proceed on this road for 0.6 miles, at which point there will be an intersection. Go right (southeast) for 0.7 miles to a gate. Proceed through the gate for 0.8 miles to a second gate. Go through the second gate and drive 1.25 miles to the end of the road. There will be a witness post on the right side of the road at the base of a twin trunk *Pinus flexilis*. From the witness post walk uphill 33 paces at 193 degrees magnetic to the 0-foot stake. The study is marked by green steel "T" fence posts approximately 12 to 18 inches in height.

Map Name: New Harmony

Diagrammatic Sketch

Township 39S, Range 15W, Section unsurveyed

GPS: NAD 27, UTM 12S 4144653 N, 283079 E

DISCUSSION

Deep Canyon - Trend Study No. 30-35

This trend study is located on fawn rearing habitat in the Deep Creek drainage on the south side of Grass Valley. There is ample vegetation for browsing, escape, and thermal cover. A small stream is located approximately 1/4 mile away at the base of the hill. The study area is mixed mountain brush which is predominantly sagebrush and curleaf mountain mahogany. Elevation is approximately 7,500 feet on a steep slope which varies from 40% near the beginning of the baseline to 65% near the end of the baseline. Aspect is north-northeast. The study is located on the USFS Pine Valley allotment and is grazed from July 15-October 15, although livestock don't appear to be using the steeper slopes. Pellet group data from 1998 (June 30) estimated 40 deer days use/acre (99 ddu/ha) and only 3 cow days use/acre (7 cdu/ha). Cattle pats counted appeared to be from the previous season. Pellet group data from 2003 estimated 75 deer days use/acre (185 ddu/ha) and only 4 cow days use/acre (10 cdu/ha) which occurred during the previous summer. This area would normally be considered summer range except during mild years when spring and fall use may also occur. With mild conditions several years prior to the 2003 reading, deer pellets in 2003 indicated spring-summer-fall use.

Soils are shallow in places and rocky on the surface and throughout the profile. There is some exposed bedrock. Soil depth is variable, but moderately deep overall with an estimated effective rooting depth of almost 16 inches. Texture is a sandy loam which is moderately acidic (pH 5.8). Soil movement is apparent, causing considerable pedestalling on the uphill side of shrubs and trees. Wildlife and livestock also trail across the slope causing substantial terracing. Ground cover is patchy with abundant rock and pavement cover. The high rock cover tends to accelerate runoff, and herbaceous vegetation cover is not sufficient to hold the soil. The erosion condition class was determined to be slight in 2003.

Browse composition is divided among several species. The taller growth forms include pinyon pine, curleaf mountain mahogany, and a few mature Gambel oak. Lower growing, more available browse plants include mountain big sagebrush, slenderbush eriogonum, mountain snowberry, young curleaf mahogany, young Gambel oak, and Utah serviceberry. Curleaf mountain mahogany provided 35% of the browse cover in 1998 and 22% in 2003. They numbered 580 mostly mature plants/acre in 2003. Most plants are at least partly available to browsing while some are tree-like and unavailable due to height. Overhead canopy cover averaged about 30% in 1998 and 2003. Use of the available cliffrose has been moderate to heavy with the heaviest use reported in 1992. Vigor remains normal and percent decadence low. Seedling and young recruitment has been good during all readings.

The primary understory shrubs include mountain big sagebrush, slenderbush eriogonum, and snowberry. Sagebrush provided 31% of the browse cover in 1998 increasing to 53% in 2003. The sagebrush population has increased steadily with each reading from 1,266 plants/acre in 1982 to 4,660 by 2003. Use has been mostly light, vigor good, and percent decadence low. Age class composition indicates an increasing population. Slenderbush eriogonum and snowberry appear to have stable populations displaying light to moderate use, good vigor, and low decadence. Other preferred shrubs that occur in small numbers include Utah serviceberry, Parry rabbitbrush, and antelope bitterbrush.

The herbaceous understory is moderately abundant, yet provides irregular ground cover. Perennial grasses are diverse with mutton bluegrass and Letterman needlegrass combining to produce 76% of the grass cover in 1998 and 78% in 2003. Blue grama and bottlebrush squirreltail are also fairly abundant.

Forbs are abundant and diverse and produce as much cover as the grasses. However, composition could be better as annuals like littleflower collinsia and false flax (*Microsteris gracilis*) dominate and account for much of the forb cover. The most common perennial forbs include Eaton fleabane, redroot eriogonum, thicketleaf peavine, and desert phlox.

1982 APPARENT TREND ASSESSMENT

Soil condition is only fair, but is not obviously deteriorating. Increased grasses appear to be moving into previously barren areas and may eventually stabilize them. Vegetatively, there is a stable browse component and a vigorous forb understory. Overall vegetative trend appears stable.

1992 TREND ASSESSMENT

Since 1982, bare ground has decreased and rock and pavement cover combined have increased. Some slight soil erosion is evident, but it was noted that vegetation and rocks have caused a terracing effect that may hold most of the soil in place. Vegetative cover is still low, but has doubled since 1982. Litter cover has increased slightly. Total forb quadrat frequency decreased with only a few select forbs increasing. Browse composition is good and has increased to a total of 12,125 browse plants/acre from the 6,197 plants/acre present in 1982.

TREND ASSESSMENT

soil - stable (3)

browse - slightly up (4)

herbaceous understory - slightly up (4)

1998 TREND ASSESSMENT

Trend for soil is down slightly. Percent bare ground has increased slightly, while litter cover has declined from 46% to 32%. Pavement and rock cover have increased from 11% in 1982, to 29% in 1992, and 36% currently. This increase would suggest soil movement from the site leaving more rock and pavement exposed. Trend for browse is up slightly. Mountain big sagebrush is increasing, whereas other preferred species appear to have stable to slightly increasing populations. Use is lighter overall than what was reported in 1992, vigor is good, and percent decadence is low. Trend for the herbaceous understory is down slightly. Sum of nested frequency for perennial grasses is slightly down with a significant decline in the nested frequency of mutton bluegrass. Sum of nested frequency for forbs has declined even more, with several forbs abundant in 1992 declining significantly in frequency.

TREND ASSESSMENT

soil - down slightly (2)

browse - up slightly (4)

herbaceous understory - down slightly (2)

2003 TREND ASSESSMENT

Trend for soil is slightly improved. Cover of bare ground has declined slightly while litter cover has increased. In addition, cover of rock and pavement has declined slightly. There is still some localized erosion occurring due to the steep slope, but it is not severe and the erosion condition class was determined to be slight in 2003. Trend for browse is up for the key species, curleaf mountain mahogany and mountain big sagebrush. Mahogany has increased in density by 28%. It shows moderate to heavy use on available plants but vigor remains good and no decadent plants were sampled. Mountain big sagebrush provides most of the understory shrub cover. It has increased 25% in density to 4,660 plants/acre. Use remains mostly light, vigor good, and percent decadence low. Due to the high elevation, aspect, and importance of this area as fawning habitat, shrubs are not the most important vegetational aspect. The herbaceous understory, especially forbs is much more important for deer in the early spring. The herbaceous understory on this site is fairly abundant but patchy in its distribution. Trend is considered slightly down due to a decline in the sum of nested frequency for perennial grasses and forbs. Average herbaceous cover also declined nearly twofold since 1998. The forb composition is also poor with annuals and low growing perennials providing much of the cover.

TREND ASSESSMENT

soil - up slightly (4)

browse - up (5)

herbaceous understory - down slightly (2)

HERBACEOUS TRENDS --

Management unit 30 , Study no: 35

Type	Species	Nested Frequency			Average Cover %	
		'92	'98	'03	'98	'03
G	Agropyron trachycaulum	5	2	-	.18	-
G	Bouteloua gracilis	14	11	10	.83	.04
G	Bromus tectorum (a)	-	8	9	.01	.04
G	Carex spp.	3	-	-	-	-
G	Koeleria cristata	-	4	-	.15	-
G	Poa fendleriana	_b 217	_a 152	_a 118	3.85	2.59
G	Poa pratensis	_a -	_a -	_b 10	.03	.08
G	Poa secunda	_a -	_b 34	_a 8	.45	.04
G	Sitanion hystrix	_b 89	_b 76	_a 37	.71	.28
G	Stipa columbiana	8	9	12	.24	.11
G	Stipa comata	_a 5	_a -	_b 44	-	.45
G	Stipa lettermani	_b 137	_b 141	_a 69	4.42	1.23
Total for Annual Grasses		0	8	9	0.01	0.04
Total for Perennial Grasses		478	429	308	10.88	4.84
Total for Grasses		478	437	317	10.90	4.89
F	Agoseris glauca	_a -	_b 18	_b 28	.06	.19
F	Antennaria rosea	_a 10	_{ab} 14	_b 25	.60	.49
F	Arabis spp.	9	12	2	.02	.03
F	Astragalus argophyllus	_b 13	_a -	_a -	-	-
F	Aster spp.	-	-	1	-	.00
F	Astragalus spp.	7	2	1	.30	.00
F	Balsamorhiza sagittata	-	3	7	.15	.08
F	Calochortus nuttallii	_a -	_a 1	_b 14	.00	.05
F	Chenopodium fremontii (a)	-	-	2	-	.01
F	Comandra pallida	-	-	2	-	.00
F	Collinsia parviflora (a)	-	_a 152	_b 211	2.54	3.04
F	Crepis acuminata	_a -	_b 25	_a 4	.15	.07
F	Delphinium nuttallianum	_a -	_a -	_b 17	-	.07
F	Epilobium brachycarpum (a)	-	8	-	.02	-
F	Erigeron eatonii	_b 91	_b 82	_a 41	1.14	.31

Type	Species	Nested Frequency			Average Cover %	
		'92	'98	'03	'98	'03
F	Eriogonum racemosum	_b 70	_a 19	_a 13	.10	.16
F	Eriogonum umbellatum	-	4	4	.03	.03
F	Fritillaria atropurpurea	-	-	9	-	.04
F	Galium spp.	-	8	2	.07	.00
F	Hackelia patens	_b 56	_a 18	_{ab} 36	.37	.54
F	Heuchera parvifolia	2	-	-	-	-
F	Lathyrus brachycalyx	_b 60	_a 21	_a 13	.45	.10
F	Lappula occidentalis (a)	-	_b 29	_a -	.41	-
F	Lithophragma tenella	_a -	_a -	_b 25	-	.14
F	Lomatium spp.	_a -	_a 4	_b 32	.01	.35
F	Lupinus argenteus	_b 23	_b 19	_a 5	.55	.21
F	Machaeranthera canescens	_b 8	_a -	_a -	.01	-
F	Microsteris gracilis (a)	-	_b 95	_a 1	1.41	.00
F	Pedicularis centranthera	3	-	-	-	-
F	Petradoria pumila	_{ab} 9	_b 18	_a 4	.71	.02
F	Phlox austromontana	79	63	45	1.04	.71
F	Polygonum douglasii (a)	-	_b 38	_a 7	.08	.05
F	Senecio multilobatus	3	-	3	-	.01
F	Silene douglasii	_b 8	_a -	_a -	-	-
F	Taraxacum officinale	14	18	4	.13	.03
F	Zigadenus paniculatus	-	-	-	-	.00
Total for Annual Forbs		0	322	221	4.47	3.10
Total for Perennial Forbs		465	349	337	5.96	3.71
Total for Forbs		465	671	558	10.44	6.82

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --

Management unit 30 , Study no: 35

Type	Species	Strip Frequency		Average Cover %	
		'98	'03	'98	'03
B	Abies concolor	2	4	-	.00
B	Amelanchier utahensis	4	1	-	.15
B	Artemisia tridentata vaseyana	75	79	6.40	11.10
B	Cercocarpus ledifolius	18	15	7.19	4.61
B	Chrysothamnus parryi	3	1	-	-
B	Eriogonum microthecum	75	51	4.66	1.89
B	Mahonia repens	2	4	.15	.04
B	Opuntia spp.	11	13	.01	.06
B	Pachistima myrsinites	4	15	.00	.90
B	Pinus edulis	4	2	.15	.38
B	Purshia tridentata	3	0	-	-
B	Quercus gambelii	7	2	.03	.18
B	Symphoricarpos oreophilus	30	25	2.00	1.80
Total for Browse		238	212	20.61	21.14

CANOPY COVER, LINE INTERCEPT --

Management unit 30 , Study no: 35

Species	Percent Cover	
	'98	'03
Abies concolor	-	.68
Amelanchier utahensis	-	6.73
Artemisia tridentata vaseyana	-	8.69
Cercocarpus ledifolius	30.00	28.79
Eriogonum microthecum	-	1.85
Opuntia spp.	-	.26
Pachistima myrsinites	-	.63
Pinus edulis	1.20	.76
Quercus gambelii	-	.08
Symphoricarpos oreophilus	-	1.39

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 30 , Study no: 35

Species	Average leader growth (in)
	'03
Artemisia tridentata vaseyana	1.7

POINT-QUARTER TREE DATA --
Management unit 30 , Study no: 35

Species	Trees per Acre		Average diameter (in)	
	'98	'03	'98	'03
Cercocarpus ledifolius	N/A	117	N/A	6.5

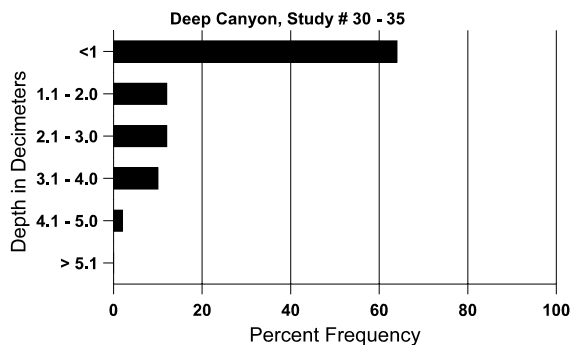
BASIC COVER --
Management unit 30 , Study no: 35

Cover Type	Average Cover %		
	'92	'98	'03
Vegetation	7.75	36.31	33.45
Rock	12.25	23.92	22.54
Pavement	17.00	11.67	7.75
Litter	46.00	31.70	33.90
Cryptogams	.50	.47	.10
Bare Ground	16.50	20.27	18.53

SOIL ANALYSIS DATA --
Management unit 30, Study no: 35, Study Name: Deep Canyon

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m
15.5	54.4 (15.3)	5.8	68.0	17.4	14.6	3.4	12.1	163.2	0.5

Stoniness Index



PELLET GROUP DATA --

Management unit 30 , Study no: 35

Type	Quadrat Frequency		Days use per acre (ha)	
	'98	'03	'98	'03
Sheep	1	-	-	-
Rabbit	1	5	-	-
Deer	26	23	40 (99)	75 (185)
Cattle	4	1	2 (5)	4 (11)

BROWSE CHARACTERISTICS --

Management unit 30 , Study no: 35

		Age class distribution (plants per acre)					Utilization				
Y	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Abies concolor											
82	0	-	-	-	-	-	0	0	-	0	-/-
92	66	-	66	-	-	-	0	0	-	0	-/-
98	60	-	60	-	-	-	0	0	-	0	-/-
03	80	40	60	20	-	-	0	0	-	0	-/-
Amelanchier utahensis											
82	0	-	-	-	-	-	0	0	0	0	-/-
92	0	-	-	-	-	-	0	0	0	0	-/-
98	100	-	40	40	20	-	20	20	20	20	26/21
03	20	-	-	20	-	-	0	100	0	0	14/17
Artemisia tridentata vaseyana											
82	1266	-	333	600	333	-	0	0	26	0	19/27
92	2666	1066	1266	1000	400	-	18	3	15	8	20/26
98	3500	780	840	2340	320	220	7	1	9	4	22/30
03	4660	260	1620	2520	520	360	0	0	11	3	16/30
Cercocarpus ledifolius											
82	866	-	200	666	-	-	31	0	0	0	40/42
92	1199	600	333	733	133	-	11	56	11	0	57/35
98	420	200	100	300	20	20	24	10	5	0	102/101
03	580	100	180	400	-	20	14	31	0	0	78/66
Chrysothamnus parryi											
82	66	-	-	66	-	-	0	0	-	0	21/22
92	66	-	66	-	-	-	0	100	-	0	-/-
98	100	-	20	80	-	-	20	0	-	0	6/7
03	100	-	-	100	-	-	0	100	-	0	5/7

		Age class distribution (plants per acre)					Utilization				
Y e a r	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
<i>Eriogonum microthecum</i>											
82	2266	-	-	2266	-	-	9	0	0	0	9/18
92	6198	-	1866	4266	66	-	41	3	1	2	7/8
98	4920	60	660	4240	20	40	16	0	0	0	7/12
03	3560	20	220	3240	100	120	0	0	3	.56	5/10
<i>Gutierrezia sarothrae</i>											
82	0	-	-	-	-	-	0	0	-	0	-/-
92	0	-	-	-	-	-	0	0	-	0	-/-
98	0	-	-	-	-	-	0	0	-	0	-/-
03	0	-	-	-	-	-	0	0	-	0	6/5
<i>Mahonia repens</i>											
82	0	-	-	-	-	-	0	0	0	0	-/-
92	0	-	-	-	-	-	0	0	0	0	-/-
98	180	-	-	180	-	-	0	0	0	0	5/8
03	720	20	160	540	20	-	0	0	3	3	3/3
<i>Opuntia</i> spp.											
82	133	-	-	133	-	-	0	0	0	0	4/5
92	398	-	66	266	66	-	0	0	17	17	7/9
98	220	-	40	160	20	20	0	0	9	9	6/21
03	400	-	-	280	120	-	0	0	30	30	6/15
<i>Pachistima myrsinites</i>											
82	0	-	-	-	-	-	0	0	-	0	-/-
92	0	-	-	-	-	-	0	0	-	0	-/-
98	120	-	20	100	-	-	0	0	-	0	5/4
03	880	-	-	880	-	-	41	36	-	0	3/8
<i>Pinus edulis</i>											
82	0	-	-	-	-	-	0	0	-	0	-/-
92	0	-	-	-	-	-	0	0	-	0	-/-
98	80	40	60	20	-	-	0	0	-	0	-/-
03	40	20	20	20	-	-	0	0	-	0	-/-
<i>Purshia tridentata</i>											
82	0	-	-	-	-	-	0	0	-	0	-/-
92	0	-	-	-	-	-	0	0	-	0	-/-
98	120	-	40	80	-	-	0	0	-	0	-/-
03	0	-	-	-	-	-	0	0	-	0	-/-

		Age class distribution (plants per acre)					Utilization				
Y e a r	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
<i>Quercus gambelii</i>											
82	600	-	-	600	-	-	0	100	0	0	12/5
92	133	133	133	-	-	-	0	0	0	0	-/-
98	480	120	360	100	20	20	0	0	4	0	59/61
03	60	820	60	-	-	-	0	0	0	0	16/14
<i>Symphoricarpos oreophilus</i>											
82	1000	-	200	800	-	-	47	0	0	0	22/24
92	1399	400	600	666	133	-	5	38	10	0	20/26
98	1120	180	300	680	140	40	13	0	13	0	13/28
03	1100	100	280	800	20	60	4	13	2	2	13/28